FINANCIAL ASSISTANCE
ANNOUNCEMENT OF
FUNDING OPPORTUNITY

Solid State Lighting Core Technologies

DE-PS26-04NT42092-00

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Information regarding this Funding Opportunity Announcement is available on the Department of Energy, Industry Interactive Procurement System (IIPS) web site at: http://e-center.doe.gov

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SECTION I - FUNDING OPPORTUNITY DESCRIPTION

1.1 SUMMARY

Solid State Lighting

Goal:
By 2015, develop advanced solid state lighting technologies that compared to conventional lighting technologies, are much more energy efficient, longer lasting, and cost competitive by targeting a product system efficiency of 50 percent with lighting that accurately reproduces sunlight spectrum.

The Department of Energy (DOE), National Energy Technology Laboratory (NETL), on behalf of the Office of Energy Efficiency and Renewable Energy's (EERE) Building Technologies Program (BT), is seeking applications for applied research in the Solid State Lighting (SSL) Core Technologies Program. DOE has set aggressive and ambitious goals for SSL Research and Development: By 2015, to develop advanced solid state lighting technologies that, compared to conventional lighting technologies, are much more energy efficient, longer lasting, and cost-competitive. The objective of the present Funding Opportunity Announcement is to support applied research in certain key technical areas by fostering a collaborative atmosphere favorable to overcoming the significant, although not impossible, technical challenges that restrict the application of SSL today to only relatively low luminous output products.

While the current generation of SSL products are commercially viable and in some instances, may serve the energy conservation goals of the DOE, they are most often used in markets that do not produce the large energy conservation objectives sought by DOE. Moreover, the technical challenges that impede penetration into mainstream general illumination markets are complex and require the combined resources of many researchers and perhaps, the unique research tools found only at a limited number of universities, National Laboratories and research institutions. It may be difficult to overcome these critical technical challenges without a focused Government initiative. Partly, this is because the high payoffs sought may be judged too risky for industry to undertake alone. Thus, the collaborations sought under this Funding Opportunity Announcement will "buy down" or reduce the level of technical risk by providing significant financial resources, yet will allow any resultant intellectual property to remain with the performing organization compliant with applicable guidelines specified elsewhere in this Funding Opportunity Announcement (see Section VIII, Articles 8.7 and 8.8).

1.2 BACKGROUND INFORMATION

The lighting industry is nearly 100 years old and is often characterized as a mature industry. As with any mature commodity-based business, little innovation or research is expended towards product evolution or innovation beyond what is needed to maintain manufacturing, marketing and distribution costs within acceptable parameters. Thus, little industrial funding is available to support a concentrated research effort aimed at exploiting the promise of a revolutionary technology like SSL. Throughout the past four years, with well over 10,000 person hours invested by industry, academia and Government, the prevailing theme that has surfaced repeatedly is that the promise of solid state lighting will only be produced through a focused and concentrated effort between the stake holders.

Electricity consumed for lighting represents about 8.2 Quads or nearly 8.5 % of all the primary energy consumed annually by the Nation. Lighting also consumes 22% of all electricity in buildings.

Today, the lighting industry in North America is worth approximately $45 Billion in sales annually. Of this, approximately $12 Billion is associated with lamps while the remaining sales are divided up between fixtures, components (including ballasts and controls) and services such as design and maintenance. High brightness LED sales, a popular product thought by many to be the nearest term solution to SSL, is a $1 to $2 Billion business with exponential growth prospects. Still, even though each of the major lamp manufacturers is involved in some sort of a SSL venture, most of the technology development is being advanced by companies unfamiliar with the century-old experiences in the fiercely competitive environment associated with lighting. For these reasons, it is difficult to imagine that the lighting industry would undertake the development of energy efficient and cost competitive SSL products alone.

To address these issues and to advance energy conservation in lighting in US Buildings, the DOE's Building Technologies Program maintains a Lighting Research and Development (LR&D) activity. Key to the objectives of

this activity is its mission statement.

Lighting Research and Development Program

Mission:
To increase end-use efficiency in buildings by aggressively researching new and evolving lighting technologies, in close collaboration with partners, to develop viable methodologies that have the technical potential to conserve 50% of electric lighting consumption by 2010.

To insure that its research portfolio meets critical and evolving needs in a timely fashion, the LR&D activity has and continues to host industry-led efforts to develop and maintain a series of technology road maps for the various technologies that comprise the lighting business. While not the only lighting technology of interest within the Building Technologies Program portfolio, SSL is the ***singular*** focus of the present Funding Opportunity Announcement. SSL has been the focus of five discrete road-mapping exercises during the past three years. The most recent event was held in November, 2003. It was successful in prioritizing the applied research areas described in this Funding Opportunity Announcement. These technical priorities and need areas are outlined in Article 1.4, "Program Areas of Interest." Information developed for and by this workshop may be viewed and downloaded at http://www.netl.doe.gov/ssl/. Workshops like this one are planned in the future and will help to align Government SSL R&D directions with the high-priority needs identified by industry.

The SSL portfolio has developed a specific statement of objectives tailored to the aggressive needs suitable for general illumination applications. It targets aggressive performance goals that, if met and successfully deployed into the marketplace, will achieve the energy conservation goals of the LR&D program while meeting or exceeding the performance attributes of electric light that allows for direct comparison to natural sunlight spectra.

The present Funding Opportunity Announcement is the first in a series that may span the next decade. As the relevant SSL technology base matures, it is anticipated that the level of technology maturation will advance from the present level, applied research, eventually to market conditioning once the targets for efficiency, cost, longevity, stability and control are demonstrated in a product environment. This sequence of technology maturation is illustrated graphically in the figure below.

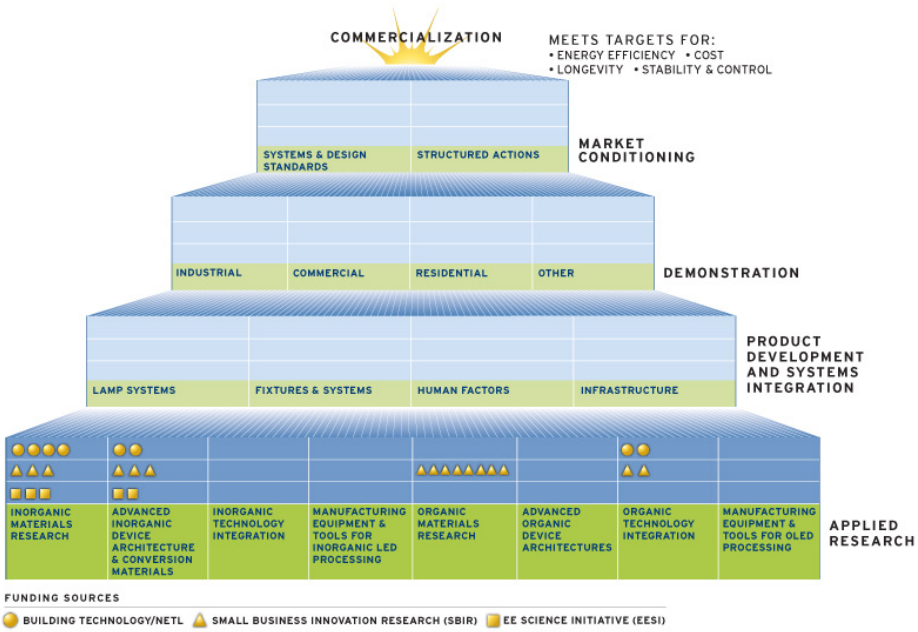

Figure 1 – Pyramid Schematic Representation of the DOE's Solid State Lighting Portfolio.

Resulting in part from the November, 2003 meeting, EERE will conduct a series of actions to complete the levels of the pyramid. The first action, running concurrently to this Funding Opportunity Announcement, will be to

competitively select a group (referred to as the SSL Partnership) that broadly represents the SSL manufacturing industry. It is envisioned that, among other things, the Partnership will provide input and prioritization of future Core Technology needs. The Government will enter into a Memorandum of Agreement (MOA) with the selected Partner since no Federal funding will be provided to the MOA Partner. The second action, this Funding Opportunity Announcement, seeks to identify the Core Technology needs in an attempt to address the crosscutting or technology gap needs, benefiting multiple technology platforms and manufacturers. A National Laboratory Call, exclusively restricted to only National Laboratories, will run concurrently with this Funding Opportunity Announcement to also address the Core Technologies. Lastly, EERE, at a later time this Fiscal Year, intends to release a second Funding Opportunity Announcement for Industrial Product Development to support the development of marketable, energy efficient products. It is the intent of DOE to require all awardees under this solicitation to offer the product development organizations and the members of the SSL Partnership Group an opportunity to negotiate a non-exclusive license for any invention made under a resulting award. This will be accomplished through an "exceptional circumstance" determination under the Bayh-Dole Act for domestic small business entities and nonprofits, including educationals, and through any advance patent waiver granted to any other type of organization.

Current information about the DOE's SSL portfolio can be found at **http://www.netl.doe.gov/ssl/**

Information about advanced building technologies, systems and partnership opportunities that promote energy efficiency, renewable energy and pollution prevention is at **http://www.eren.doe.gov/buildings/**

A summary report, titled "Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report", detailing the SSL workshop can be found at **http://www.netl.doe.gov/ssl/**

1.3 OBJECTIVES

The specific focus of this Funding Opportunity Announcement is to insure that the LR&D portfolio of SSL technology sufficiently addresses the Core Technologies that can be readily and widely applied to existing and future lighting products, which in turn will be energy efficient and cost competitive. It is in this collaborative atmosphere that applications are sought; applications that are truly innovative and groundbreaking, fill technology gaps, provide enabling knowledge or data, and will represent a significant advancement in the SSL technology base.

The overall objectives of the SSL portfolio span four broad categories as is illustrated in the Pyramid Schematic in Figure 1. The present Funding Opportunity Announcement covers only applied research, the foundation that the rest of the SSL portfolio is built upon.

Many of the needs identified in Article 1.4, "Program Areas of Interest" are described in terms of applied research objectives. Ordinarily, these descriptions are associated with products or a specific product vision. Due to the perceived early stage of SSL portfolio, such advanced descriptions are not possible. However, the six stages of maturity for a given technology are described below in product terms. Such descriptions are not meant to indicate that only projects which directly result in a marketable product are sought in this Funding Opportunity Announcement. Progress towards meeting many of the specific needs in Article 1.4 can be made by advancements in enabling technology or basic knowledge and information.

For the purposes of this Funding Opportunity Announcement, research to produce generic technology, knowledge and information is considered not to be applied research as defined in this section. Such "basic research" is specifically excluded in this Funding Opportunity Announcement.

Therefore, the technology maturation stage eligible for this Funding Opportunity Announcement is limited to Stage 2 only. However, each stage is defined below in order to provide the overall picture of which stage a particular R&D activity on a technology may fit.

Technology Maturation Stage 1 – Basic Science Research (excluded from this FOA)

Fundamental science exploration is performed to expand the knowledge-base in a given field. Scientific principles (with data-empirical and/or theoretical derivation) are formulated and proven. The output from these projects would generally be peer-reviewed papers published in recognized scientific journals. Specific applications are not necessarily identified in Stage 1.

Technology Maturation Stage 2 - Applied Research

Scientific principles are demonstrated, an application is identified, and the technology shows potential advantages in performance over commercially available technologies. Lab testing and/or math modeling is performed to identify the application(s), or provide the options (technical pathways) to an application. Testing and modeling add to the knowledge base that supports an application and point to performance improvements.

Technology Maturation Stage 3 – Exploratory Development (excluded from this FOA)

A product concept addresses an energy efficiency priority. From lab performance testing, down select from alternative technology approaches for best potential performance, via selection of materials, components, processes, cycles, and so on. With lab performance testing data, down select from a number of market applications to the initial market entry ideas. This product concept must exhibit cost and/or performance advantages over commercially available technologies. Technical feasibility should be demonstrated through component bench-scale testing with at least a laboratory bread board of the concept.

Technology Maturation Stage 4 – Advanced Development (excluded from this FOA)

Product concept testing is performed on a fully functional lab prototype – "proof of design concept" testing. Testing is performed on prototypes for a number of performance parameters to address issues of market, legal, health, safety, etc. Through iterative improvements of concept, specific applications and technology approaches are refocused and "down selected." Product specification (for manufacturing or marketing) is defined. Technology should identify clear advantages over commercially available technologies, and alternative technologies, from detailed assessment.

Technology Maturation Stage 5 – Engineering Development (excluded from this FOA)

"Field ready prototype" system is developed to refine product design features and performance limits. Performance mapping is evaluated. Performer conducts testing of a field-ready prototype/system in a representative or actual application with a small number of units in the field. The number of units is a function of unit cost, market influences (such as climate), monitoring costs, owner/operator criteria, etc. Feedback from the owner/operator and technical data gathered from field trials are used to improve prototype design. Further design modifications and re-testing are performed as needed.

Technology Maturation Stage 6 – Product Demonstration (excluded from this FOA)

Operational evaluation of the demonstration units in the field is conducted to validate performance as installed. Third party monitoring of the performance data is required, although less data is recorded relative to the "field ready prototype" test in Stage 5. Pre-production units may be used. Size of demo is a function of unit cost, monitoring cost, etc., and involves relatively more visibility. Energy savings are measured, with careful analysis of economic viability and field durability for specific applications.

1.4 PROGRAM AREAS OF INTEREST

There are six specific Areas of Interest for this Funding Opportunity Announcement that were identified in the SSL Workshop of November, 2003 as high priority applied research areas. Applicants must select and target only one (1) Area of Interest per application. A separate application must be submitted for each technology or technical approach targeted under a single Area of Interest. Any single application that offers two or more technologies or technical approaches will be rejected without discussion and will not be evaluated for funding.

Applications from the same applicant that appear nearly identical (e.g. different only to the extent of operational or experimental variations) will be rejected, with only one application retained as representative of the group. This applies whether the applications are in one Area of Interest or multiple Areas of Interest. The single application retained for evaluation will be evaluated in the Area of Interest that DOE determines is most appropriate.

The Areas of Interest target innovations in both Light Emitting Diodes (LED) and Organic Light Emitting Diodes (OLED). Descriptive information on each of these six Areas of Interest is provided in the following paragraphs:

LED

Area of Interest 1: High efficiency visible and near UV (>380 nm) semiconductor materials for LED based general illumination technology – Area of Interest Number: (DE-PS26-04NT42092-01)

Current nitride compound semiconductors are incapable of achieving the price and performance targets that are competitive in general illumination applications for a variety of reasons. While significant improvements have been made, today's products are not able to meet these requirements primarily due to limitations in materials and packaging. Also, a complete basic understanding of how material quality ultimately affects device performance is still lacking. Significant advancements in the basic materials technology associated with visible and near UV LEDs are required to advance performance characteristics of current devices beyond their present limitations of 50 to 80 LPW. These advancements must not only produce the substantial gains in the light production efficiency required, but must also address the significant costs normally associated with the complex and labor intensive epitaxial growth required to produce these devices. Applied research in conventional nitride systems and exploration of novel material systems is necessary to produce the efficient materials system(s) required for general illumination challenges. Improvements by several orders of magnitude to the price and performance of these devices are vital to make them practical solutions. Also, advancements in P-doping efficiency and novel charge introduction structures may produce significant fundamental advancements in existing materials systems. Advancements in high purity process materials and growth structures may also significantly improve device performance by limiting photon inhibiting processes thought to be associated with defects, dislocations, and other crystalline artifacts.
[For more information, refer to SSL research topic 1.1.2 of *Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report* at http://www.netl.doe.gov/ssl/]

Area of Interest 2: Advanced architectures and high power conversion efficiency emitters - Area of Interest Number: (DE-PS26-04NT42092-02)

Advanced device architectures that optimize both electrical transport and optical properties will be needed to achieve longer-term efficiency goals in excess of 160 lumens/Watt and consequently, meaningful energy savings. Traditional LED designs will rely on novel fabrication methods, including chip-shaping, texturing, laser liftoff, etching, and novel metallization for improved efficiency. More advanced light emitting designs that might include micro cavities, photonic lattices, quantum dots, edge-emitting and vertical-cavity laser structures are sought under this area. Fundamental advancements and novel innovations associated with chip-level architectures and high power conversion efficiency are believed by many to be the key to production of significant increases in power handling capability. Applied research directed at novel chip scaling, producing practical and cost efficient multi-color chips, or resonant cavity devices such as lasers or directional emitters may each produce the desired increases in power capability. Also, for conventional chip designs, the dimensions and locations of contacts are limiting and as chips become larger and of greater power handling capacity, development of novel contact materials and geometries will become increasingly important.
[For more information, refer to SSL research topic 1.2.1 of *Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report* at http://www.netl.doe.gov/ssl/]

Area of Interest 3: High temperature, efficient, long-life phosphors, luminescent materials for wavelength conversion and encapsulants - Area of Interest Number: (DE-PS26-04NT42092-03)

Near term SSL general illumination products are expected to be designed around near UV or blue emitting LEDs that capture a portion of their monochromatic emissions with a yellow phosphor that in turn converts some of the pump radiation into a broader spectrum, whose combined emissivity approximates white light of good color and spectral power. Although many materials that are currently used for these purposes are reasonably efficient, even more efficient phosphors and/or luminescent materials may bring an immediate increase in device efficiency. For example, multi-photon processes can produce quantum yields in excess of unity even for relatively low energy excitations such as 380 nm. Suitable hosts and materials systems need to be developed to advance these to practical, energy efficient devices for general illumination products. Applied research is sought in this area that investigates novel phosphors and/or luminescent material synthesis and blends.

Within down-conversion approaches to white light generation, more efficient (>95%), stable (100,000 hrs), high-temperature (>150 °C), environmentally friendly phosphors with no dissipative optical absorption or scattering will need to be developed. Novel approaches are also needed and sought for the synthesis and processing of novel conversion materials, including, but not limited to nanocrystalline semiconductors, photonic lattices, quantum dots, organic coordination-compound phosphors, phosphor blends or slurries, and coated phosphors.

High-drive, high-lumen output LED devices place demanding performance requirements on encapsulation materials. Future encapsulation materials for high-power general illumination products will need to have an index > 1.6, high transmission (>80%) through thick layers throughout the visible spectrum (440-650 nm), UV filtering and resistance, low H_2O permeability for up to 100,000 hours, and withstand high processing and operation temperatures (100-150 °C). New approaches and materials are sought.
[For more information, refer to SSL research topic 1.2.2 of *Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report* at http://www.netl.doe.gov/ssl/]

OLED

Area of Interest 4: High efficiency, low-voltage, stable materials for OLED-based general illumination technology (hosts, dopants, and transport layers) - Area of Interest Number: (DE-PS26-04NT42092-04)

Today, OLEDs designed for general illumination purposes may be derived from those normally associated with display applications. This is not ideal as general illumination OLEDs have unique price and performance requirements that will allow them to perform as viable alternatives to conventional luminous sources. To evolve into this new performance domain, applied research in novel materials hosts, alternative dopants, and advancing a more comprehensive understanding of the role and design rules for charge transport in layers is sought.

Current OLED materials simply do not have the efficiency or lifetime performance necessary to qualify them as viable candidates for the demanding general illumination market. Estimates of lifetime and efficiencies necessary for OLED based general illumination are roughly 50,000 hours and 100 lumens/Watt respectively. Lifetime and efficiency of state-of-the-art white OLEDs (at 850 cd/m^2) are about 500 hours and 5 lumens/Watt respectively. To realize the full potential of OLED technology, new materials and systems are needed that offer the promise of vastly improved efficiency and stability in the active regions of the OLED device- cathode and anode layers, electron and hole transport and injection layers, emission layers, and carrier blocking layers. New phosphorescent OLED systems with nearly 100% internal quantum efficiency at high current densities are required in the red, green, and blue spectral regions. Single molecules that produce a broadband emission and that harvest triplet energies otherwise lost as heat are also needed. Innovative device structures and materials are needed to reduce high-luminance (~1000 cd/m^2) drive voltages from 10-20V to 4-5V. Compatibility with practical methods of current distribution and controls must be assured.

This topic specifically addresses the development of novel materials that might be used to create high efficiency, low voltage, stable OLEDs with improved internal quantum efficiency (IQE). Novel methods of extracting light or alternative light management approaches that produce higher external quantum efficiency (EQE) from existing materials systems and structures are south under Area of Interest 5. Likewise, novel device designs that may produce increases in IQE and EQE are sought under another Area of Interest 6.
[For more information, refer to SSL research topic 1.5.1 of *Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report* at http://www.netl.doe.gov/ssl/]

Area of Interest 5: Strategies for improved light extraction and manipulation - Area of Interest Number: (DE-PS26-04NT42092-05)

Significant advancements in OLED device performance will require applied research leading to alternative strategies for light extraction and optical management. Conventional limits on OLED out coupling efficiency is exceptionally low producing damaging heat instead of useful photonic emissions. Research in this area could include advanced modeling or exploration of novel geometries that promise to achieve 50% or more light extraction efficiency.

Current light out-coupling efficiencies are on the order of 20%. Innovative approaches utilizing surface texturing, gratings, periodic nanostructures, integrated lens or device shaping are necessary to increase the out-coupling efficiency to the desired level of >50%. Even the basic configurations and accepted practice of layering OLED structures may need to be reexamined to ascertain if the ideal geometry is possible. Other novel methods to increase device extraction efficiency like designing for some level of cavity resonance or mode structure may hold promise. With the internal quantum efficiency of basic OLED materials systems already approaching 90%, significant advancements in light extraction efficiency or external quantum efficiency (EQE) holds considerable promise. Applications to this Area of Interest may be theoretical, modeling oriented or experimental but all should represent novel approaches that offer the potential for large increases in performance, not just incremental increases in EQE.

This Area of Interest is restricted to applied research that promises a breakthrough in external quantum efficiency (EQE) commensurate with the criteria provided above. Proposals that address small, incremental increases in EQE are not of interest. Proposals representing increases in materials IQE are sought under Area of Interest 4 and proposals for novel device structures and materials systems are sought under Areas of Interest 6.
[For more information, refer to SSL research topic 1.6.1 of *Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report* at http://www.netl.doe.gov/ssl/]

Area of Interest 6: Novel device structures for improved performance and low cost - Area of Interest Number: (DE-PS26-04NT42092-06)

Practical OLED devices for general illumination applications must perform in extreme environments very different than those normally associated with today's OLEDs such as display applications like cell phones and PDAs. For the realization of the SSL market penetration sought, OLEDs must be developed that will perform at remarkable brightness levels for periods measured in tens of thousands of hours at extreme temperatures, with no degradation in luminous performance. Thus, applied research directed at meeting these challenges is sought that will ultimately give rise to the OLED packages that are as reliable and long lived as required for general illumination applications. Applied research in this area may include novel materials and hosts that help to achieve these goals but may also include innovations associated with existing materials systems and structures.

As the internal efficiency and stability of new OLED materials improves, OLED researchers will need to focus their attention on novel device architectures. This is especially important for maximizing light extraction (as above) but may be just as important for manufacturing cost reductions or for adding additional functionality such as pixilation or variable light attenuation. Equally important and perhaps nearer term are new ideas in the area of white OLEDs to improve the color stability over time and operating conditions. Concepts including RGB blends, monomer-excimer complexes, separate RGB emissive layers, and pixilation need to be explored to

determine the optimal approach to OLED-based white light generation.

This Area of Interest is restricted to advancement of completely novel materials systems such as hybrid inorganic-organic ones and/or novel architectures such as multiple emissive layers or resonant cavity structures. Proposals that seek to advance IQE of known materials systems should be submitted to Area of Interest 4, provided that the performance criteria specified are met. Likewise, proposals that promise to increase the EQE of known architectures and structures should be submitted to that Area of Interest 5 provided the respective performance criteria for that area are satisfied.
[For more information, refer to SSL research topic 1.6.2 of *Illuminating the Challenges: Solid State Lighting Portfolio Planning Workshop Report* at http://www.netl.doe.gov/ssl/]

SECTION II - AWARD INFORMATION

2.1 TYPE OF AWARD INSTRUMENT - COOPERATIVE AGREEMENTS (OCT 2003)

DOE anticipates awarding cooperative agreements under this Program Announcement. A special award condition describing the Government's substantial involvement in the cooperative agreement is located in Section VI, Article 6.9.

2.2 ESTIMATED FUNDING (OCT 2003)

Approximately $6 million dollars is expected to be available for new awards under this announcement, funded over multiple federal fiscal years.

2.3 EXPECTED NUMBER OF AWARDS (OCT 2003)

DOE anticipates making approximately 3-6 awards this fiscal year under this announcement. However, the Government reserves the right to fund, in whole or in part, any, all, or none of the applications submitted in response to this announcement and will award that number of financial assistance instruments which serves the public purpose and is in the best interest of the Government. In addition, the Government reserves the right to make "conditional selections" in the event that future funding should become available.

2.4 ANTICIPATED AWARD SIZE (OCT 2003)

DOE estimates that awards are not to exceed the following. However, applicants are not encouraged to try to equal these estimates but should offer applications with logical work plans and appropriate costs:

Project Period Length:	Maximum Federal Share:
12 months	$900,000
12 – 24 months	$1,800,000
24 – 36 months	$2,700,000

This information is for estimating purposes only and in no way commits the Government. See Section III, Article 3.3 for Cost Share guidance.

2.5 PERIOD OF PERFORMANCE (OCT 2003)

DOE anticipates making awards that will range from twelve (12) months to thirty-six (36) months. Awards will have project and budget periods that are specific to the project and funding.

SECTION III -ELIGIBILITY INFORMATION

3.1 ELIGIBLE APPLICANTS (OCT 2003)

All types of applicants are eligible to apply, except other Federal agencies, Federally Funded Research and Development Centers (FFRDCs), and nonprofit organizations described in section 501(c)(4) of the Internal Revenue Code of 1986 that engage in lobbying activities.

3.2 NOTICE REGARDING ELIGIBILITY OF ORGANIZATIONS DESCRIBED IN SECTION 501(C)(4) OF THE INTERNAL REVENUE CODE (OCT 2003)

Applicant organizations that are described in section 501(c)(4) of the Internal Revenue Code of 1986 and that have engaged in any lobbying activities after December 31, 1995 are not eligible for an award. As set forth in section 3 of the Lobbying Disclosure Act of 1995, as amended, (2 U.S.C. 1602), lobbying activities are defined broadly to include, among other things, contacts on behalf of an organization with specified employees of the Executive Branch and Congress with regard to Federal legislative, regulatory, and program administrative matters.

3.3 COST SHARING OR MATCHING - EPACT (OCT 2003)

DOE has determined that the cost share must be at least 20% of the total allowable costs of the project (i.e., the sum of the recipient's allowable costs and the Federal share equals the total allowable cost of the project) and must come from non-Federal sources. (See 10 CFR Part 600 for the applicable cost sharing requirements.)

Offers to cost share more than the minimum amount may reduce the perceived level of technical risk to the Government and may positively impact their overall score as described in the evaluation criteria.

3.4 ENERGY POLICY ACT ELIGIBILITY REQUIREMENTS (OCT 2003)

Section 2306 of the Energy Policy Act of 1992 (EPACT) [42 U.S.C. 13525] imposes certain eligibility requirements on awards made under this program. In order to make an award to an applicant that is a business entity, other than a non-profit organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954, DOE must determine that the applicant's participation will be in the economic interest of the United States and that the applicant is either a U.S. owned company or is incorporated or organized under the laws of any State and that its parent company is incorporated or organized under the laws of a country that affords: (1) to U.S. owned companies opportunities comparable to those afforded to any other company to participate in government-supported joint ventures in energy research and development and in local investment opportunities; and (2) adequate and effective protection for intellectual property rights of the U. S. owned companies. Eligible applicants must be able to meet these two tests.

3.5 FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC) (JAN 2004)

FFRDC applicants are not eligible for an award. A list of the FFRDC's is available at http://www.nsf.gov/sbe/srs/ffrdc/start.htm. However, an application that includes performance of a portion of the work by a FFRDC will be evaluated and may be considered for award.

3.6 PARTICIPATION BY FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTER CONTRACTORS (OCT 2003)

Federally Funded Research and Development Center (FFRDC) contractors are not eligible for an award under this announcement, but they may be proposed as a team member subject to the following guidelines:

AUTHORIZATION FOR NON-DOE FFRDCS

The Federal agency sponsoring the FFRDC must authorize in writing the use of the FFRDC contractor on the proposed project and this authorization must be submitted with the application. The use of a FFRDC contractor must be consistent with the contractor's authority under its award and must not place the FFRDC in direct

competition with the private sector.

AUTHORIZATION FOR DOE FFRDCS

The cognizant contracting officer must authorize in writing the use of a DOE FFRDC contractor on the proposed project and this authorization must be submitted with the application. The following wording is acceptable for this authorization.

> "Authorization is granted for the [ ] Laboratory to participate in the proposed project. The work proposed for the laboratory is consistent with or complimentary to the missions of the laboratory, will not adversely impact execution of the DOE assigned programs at the laboratory, and will not place the laboratory in direct competition with the domestic private sector."

VALUE/FUNDING

The value of, and funding for, the FFRDC portion of the work will not normally be included in the award to a successful applicant. Usually, DOE will fund a DOE FFRDC contractor through the DOE field work proposal system and other FFRDC entities through an interagency agreement with the sponsoring agency.

COST SHARE

The applicant's cost share requirement will be based on the total cost of the project, including the applicant's and the FFRDC contractor's portions of the effort.

FFRDC CONTRACTOR EFFORT

The FFRDC effort, in aggregate, shall not exceed 10 % of the total estimated cost of the project, including the applicant's and the FFRDC contractor's portions of the effort. The FFRDC portion shall be limited to use of equipment and/or facilities and any related personnel costs that would apply to this use.

RESPONSIBILITY

The applicant, if successful, will be the responsible authority regarding the settlement and satisfaction of all contractual and administrative issues, including but not limited to disputes and claims, arising out of any agreement between the applicant and the FFRDC contractor.

SECTION IV - APPLICATION AND SUBMISSION INFORMATION

4.1 ADDRESS TO REQUEST APPLICATION PACKAGE (OCT 2003)

This announcement includes all the information needed to complete an application.

4.2 DUNS NUMBER (NOV 2003)

All applicants, except individuals who would personally receive an award under this announcement apart from any business or non-profit organization they may operate, must include a Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number in their application. For the purpose of this requirement, the applicant is the entity that meets the eligibility criteria and has the legal authority to apply for an award. For example, a consortium formed to apply for an award must obtain a DUNS number for that consortium. For assistance in obtaining a DUNS number at no cost to you, call the DUNS Number request line at 1 866-705-5711. Be prepared to provide the following information: (1) Organization name; (2) Address; (3) Telephone number; (4) Line of business; (5) Chief executive officer/key manager; (6) Date the organization was started; (7) Number of people employed; (8) Organization affiliation. If you do not already have a DUNS number, you should obtain one as soon as you decide to submit an application.

4.3 PRE-APPLICATION - NOT REQUIRED (OCT 2003)

Pre-applications are not required.

4.4 PROGRAM AREAS OF INTEREST (OCT 2003)

This Funding Opportunity Announcement contains multiple program areas of interest identified in Section I. Applicants are cautioned that this Funding Opportunity Announcement is a Master Announcement and applications cannot be submitted under the Master. Rather, each program Area of Interest has its own program-specific number for submission of applications. For example, Area of Interest 1, "High efficiency visible and near UV (>380 nm) semiconductor materials for LED based general illumination technology," has a funding opportunity number of DE-PS26-04NT42092-01. The following table summarizes the Areas of Interest for this Announcement:

AREA OF INTEREST	APPLY UNDER
LED	
High efficiency visible and near UV (<380nm) semiconductor materials for LED based general illumination technology	DE-PS26-04NT42092-01
Advanced architectures and high power conversion efficiency emitters	DE-PS26-04NT42092-02
High temperature, efficient, long-life phosphors, luminescent materials for wavelength conversion and encapsulants	DE-PS26-04NT42092-03
OLED	
High efficiency, low-voltage, stable materials for OLED-based general illumination technology (hosts, dopants, and transport layers)	DE-PS26-04NT42092-04
Strategies for improved light extraction and manipulation	DE-PS26-04NT42092-05
Novel device structures for improved performance and low cost	DE-PS26-04NT42092-06

Applicants should submit their application under the program Area of Interest which best fits the majority of the effort to be performed. If an application is submitted under an Area of Interest in which the DOE believes fits more appropriately in another Area of Interest, DOE shall evaluate the application in the Area of Interest that is most appropriate. Do not submit an identical application under more than one Area of Interest. Applicants must select and target only one (1) Area of Interest per application. A separate application must be submitted for each technology or technical approach targeted under a single Area of Interest. Any single application that offers two or more technologies or technical approaches will be rejected without discussion and will not be evaluated for funding.

Applications from the same applicant that appear nearly identical (e.g. different only to the extent of operational or experimental variations) will be rejected, with only one application retained as representative of the group. This applies whether the applications are in one Area of Interest or multiple Areas of Interest. The single application retained for evaluation will be evaluated in the Area of Interest that DOE determines is most appropriate.

4.5 APPLICATION (DEC 2003)

Applicants must include the following files in their Electronic Application (See Section IV, Article 4.20 "Other Submission Requirements" for instructions on how to submit your Electronic Application)

For consistency, the applicant is instructed to use the file names specified below. Filename extensions shall clearly indicate the software application used for preparation of the documents (i.e., "xxx.doc" for Word files or "xxx.pdf" for Adobe Acrobat files).

MANDATORY FILES	FILENAME
Application	APPLICATION.doc
Budget	BUDGET.doc
Budget Justification	BUDGET JUSTIFICATION.doc
Project Summary/Abstract	PROJECT SUMMARY.doc
Project Narrative	PROJECT NARRATIVE.doc
Certifications/Assurances/Representations	CERTIFICATIONS-ASSURANCES.doc
ADDITIONAL FILES	
Attachment 1 FFRDC Attachment (if applicable)	FFRDC ATTACHMENT.doc
Attachment 2 BIOGRAPHICAL SKETCH	BIO ATTACHMENT.doc
Attachment 3 COMMITMENT LETTERS (if applicable)	CLTP ATTACHMENT.PDF

4.6 APPLICATION FILE (DEC 2003)

Applicants must complete a SF 424 application form. *Save this form as a Word file, named "APPLICATION.doc.*"

The SF 424 is titled "APPLICATION.doc" and is posted with this Announcement on the IIPS site.

4.7 BUDGET FILE (DEC 2003)

Applicants must complete a separate DOE F 4600.4 for each phase of support requested and a cumulative budget for the total project period.

The DOE F 4600.4 is titled "BUDGET.doc" and is posted with this Announcement on the IIPS site.

You may request funds under any of the categories listed on the form as long as the item and amount are necessary to perform the proposed work and are not precluded by the cost principles or program funding restrictions (See Section IV). *Save these budget forms in a single Word file, named "BUDGET.doc."*

If a non-DOE FFRDC contractor is to perform a portion of the work, provide a separate budget for the FFRDC contractor's work effort.

If a DOE FFRDC contractor is to perform a portion of the work, provide a DOE Field Work Proposal in accordance with the requirements in DOE Order 412.1 Work Authorization System. DOE O 412.1 is available at:

http://www.directives.doe.gov/pdfs/doe/doetext/neword/412/o4121.pdf. (see Article 4.12)

A sample format for the Field Work Proposal is provided at this site.

4.8 BUDGET JUSTIFICATION FILE (DEC 2003)

Justify proposed direct labor, travel, consultants, large sub-awards, large or unique "other direct costs", equipment, etc. For sub-awards, identify organization name, description of the scope of work, name of the project leader, and estimated total costs. The contracting officer may request a more detailed budget for a particular sub-award, if your application is selected. Provide an explanation of the source, nature, amount and availability of any proposed cost sharing.

Save this information in a Word file, named "BUDGET JUSTIFICATION.doc".

The following budget detail is required. Failure to provide the detailed cost information as described in the instructions may result in an incomplete application. Since cost share is required by this funding opportunity announcement, the applicant shall stipulate in the application the source and amount of cost sharing and the value of third party in-kind contributions proposed to meet the requirement. Additionally teaming members and subcontractors are also required to submit the below information with their budgets.

PERSONNEL -- In support of the proposed personnel costs, provide a supplemental schedule that identifies the labor hours, labor rates, and cost by labor classification for each budget year. Also indicate the basis of the labor classification, number of hours, and labor rates. An example of the basis for the labor classification and number of hours could be past experience, engineering estimate, etc. An example of the basis for the labor rates could be actual rates for the individuals who will perform the work or an average labor rate for the labor classification or a departmental average rate.

FRINGE BENEFITS -- Provide the method used to calculate the proposed rate amount. If a fringe benefit has been negotiated with, or approved by, a Federal Government agency, provide a copy of the agreement. If no rate agreement exists, provide a detailed list of the fringe benefit expenses (e.g., payroll taxes, insurances, holiday and vacation pay, bonuses) and their associated costs. Identify the base for allocating these fringe benefit expenses.

TRAVEL -- For each proposed trip, provide the purpose, number of travelers, travel origin and destination, number of days, and a breakdown of costs for airfare, lodging, meals, car rental, and incidentals. The basis for the airfare, lodging, meals, car rental, and incidentals must be provided, such as past trips, current quotations, Federal Travel Regulations, etc.

EQUIPMENT -- Provide an itemized list of each piece of equipment, its unit costs, and the basis for estimating the cost, for example, vendor quotes, catalog prices, prior invoices, etc.

SUPPLIES -- Provide an itemized list of supplies; identify the quantity of each item, its unit cost, and the basis for estimating the cost, for example, vendor quotes, catalog prices, prior invoices, etc.

CONTRACTUAL

Consultants -- Provide the hourly or daily rate along with the basis for the rate. Furnish resumes or similar information regarding qualifications or experience. Provide at least two invoices reflecting hourly or daily rates charged to customers other than the Government. A statement signed by the consultant certifying his or her availability and salary must be provided. If travel or incidental expenses are to be charged, give the basis for these costs.

Subcontractors -- Identify each planned subcontractor and its total proposed budget. Each subcontractor's budget and supporting detail should be included as part of the Applicant's budget narrative. In addition, the Applicant shall provide the following information for each planned subcontract: a brief description of the work to be subcontracted; the number of quotes solicited and received; the cost or price analysis performed by the Applicant; names and addresses of the subcontractors tentatively selected and the basis for their selection; i.e. low bidder, delivery schedule, technical competence; type of contract and estimated cost and fee or profit; and, affiliation with the Applicant, if any.

CONSTRUCTION -- Provide detail of construction costs, if applicable.

OTHER DIRECT COSTS -- Provide an itemized list with costs for any other item proposed as a direct cost and state the basis for each proposed item.

INDIRECT COSTS -- If indirect rates have been negotiated with or approved by a Federal Government agency, please provide a copy of the latest rate agreement. If you do not have a current rate agreement, submit an indirect cost rate proposal which includes the major base and pool expense groupings by line item and dollar amount. In either case, provide a breakdown of the proposed indirect costs for each of your accounting periods included in the proposal. Identify the rate and allocation base for each indirect cost, such as Overhead, General and Administrative, Facilities Capital Cost of Money, etc.

COST SHARING -- Identify the percentage level and source of cost sharing for the proposed project. Firm funding commitments are expected and documentation of those commitments must be included in the application. Additionally, the impact of DOE's cost share to the viability of the project must be addressed, to include justification for the need for Federal Funds.

NOTE: The total project cost (i.e. sum of Applicant and other participants plus DOE cost shares) must be reflected in each budget form.

A detailed estimate of the cash value (basis of and the nature, e.g., equipment, labor, facilities, cash, etc.) of all contributions to the project by each participant must be provided. Note that "cost-sharing" is not limited to cash investment. In-kind contributions (e.g., contribution of services or property; donated equipment, buildings, or land; donated supplies; or un-recovered indirect costs) incurred as part of the project may be considered as all or part of the cost share. The "cost-sharing" definition is contained in 10 CFR 600.30, 600.101, 600.123, 600.224, 600.302, 600.313 and OMB Circular A-110.

Fee or profit will not be paid to the recipients of financial assistance awards. Additionally, foregone fee or profit by the Applicant shall not be considered cost sharing under any resulting award. Reimbursement of actual costs will only include those costs that are allowable and allocable to the project as determined in accordance with the applicable cost principles prescribed in 10 CFR 600.127, 10 CFR 600.312 or 10 CFR 600.318.

4.9 PROJECT SUMMARY/ABSTRACT (DEC 2003)

The project summary/abstract must contain a summary of the proposed activity suitable for publication. It should be a self-contained document that identifies the name of the applicant, the principal investigator/project director, the project title, the objectives of the project, methods to be employed, the potential impact of the project (i.e., benefits, out comes), and participants (for collaborative projects). It should be informative to other persons working in the same or related fields and, insofar as possible, understandable to a scientifically or technically literate lay reader. This document must not include any proprietary or sensitive business information as the Department may make it available to the public. The project summary abstract must not exceed 1 page when printed using standard 8.5" by 11 paper with 1" margins (top, bottom, left and right). The form for the Project Summary is the DOE F 540.1-2.

The DOE F 540.1-2 is titled "PROJECT SUMMARY.doc" and is posted with this Announcement on the IIPS site.

Save this information in a Word file named "PROJECT SUMMARY.doc".

4.10 PROJECT NARRATIVE FILE (DEC 2003)

This file shall include a cover page indicating the funding opportunity notice number, name and address of the Applicant, point of contact, telephone/FAX number/E-Mail address, title of project, and date of application.

The project narrative file must be formatted to separately address each of the sections listed below. It is requested that the project narrative not exceed thirty (30) pages, single spaced, 1" margins (top, bottom, left, right), and when printed will fit on size 8 1/2" by 11" paper. The type must be legible and not smaller than 11 point. Evaluators will review only the number of pages specified. Any applications exceeding these limitations may result in a weakness to their overall scored based on technical evaluation Criterion 3 – Applicant and Team Member Roles & Capabilities.

Save this information in a Word file named "PROJECT NARRATIVE.doc"

Unnecessarily elaborate applications are not desired. Elaborate art work, graphics and pictures will increase the document file size. If the project narrative file size is over 5MB, we request that you use a "Zip" file compression software, such as WinZip software, to reduce the time needed to download the file.

This file should provide a clear description of the work to be undertaken and how you plan to accomplish it. It must be formatted to address each of the merit review criterion and sub-criterion listed in Section V. Provide sufficient information so that the reviewers will be able to evaluate the application in accordance with these merit review criteria.

DOE WILL EVALUATE AND CONSIDER ONLY THOSE APPLICATIONS THAT ADDRESS SEPARATELY EACH OF THE MERIT REVIEW CRITERION. The applicant should organize the Technical Discussion as follows:

1. Technical Approach

1.1. Provide a clear and concise statement of the scientific merits and validity of the proposed approach. Explain any areas of technical uncertainty and the basis for the approach selected.

1.2. Include a table of milestones for each interval of the proposed effort. Be quantitative and descriptive. Typically, projects contain one to four milestones which may be accomplished in no longer than 18 months. These milestones should relate to the determination of technical "value" as described in Criterion 2.

1.3. Provide a succinct Statement of Project Objectives (SOPO) as described below followed by an expanded discussion of technical approach with roles and responsibilities of participant. Provide a discussion of anticipated outcomes and results.

1.4. Provide a discussion of how the proposed subject and approach will impact the eventual achievement of the DOE SSL mission/goal. Please refer to Section I, Article 1.1, text box "Solid State Lighting Goal."

2. ***Technology "Value"***
   2.1. Explain how the proposed approach is applicable to multiple SSL technologies or may impact other DOE energy efficiency objectives (crosscutting). Examples might include SSL lighting and windows, SSL lighting and commercial buildings, etc.
   2.2. Explain the importance of the proposed work and its potential impact on eventual SSL products. If possible, estimates of lighting energy conservation should be made to help relate the importance of the proposed work to DOE energy efficiency goals.
   2.3. Explain the importance of the proposed work in terms of meeting the published statement of needs. If there are multiple areas addressed, please be complete.
   2.4. Explain how the proposed research will allow the DOE to achieve their SSL goals earlier than planned. Be quantitative and estimate the impact this achievement might have on cumulative lighting energy conservation.
   2.5. Describe how the technology will be made available to a cross-section of the end-user industry or other cross-cutting industries at the earliest practicable time. Include current and potential licensing strategies and a discussion of potential barriers and how they will be overcome.

3. ***Applicant and Team Members Roles and Capabilities***
   3.1. Discuss the ability of the team to perform and achieve the goals stated in the SOPO. This should include current corporate experience and success in similar projects resulting in successful technology development and commercialization or technology transfer to commercial product(s).
   3.2. Discuss the ability of the Applicant to perform "project management" on previous projects, Federal or non-Federal. The Proposer, or "Prime," is expected to perform a major portion of the effort for this work. (Minimal participation by the Prime may negatively demonstrate overall project management ability.)
   3.3. Provide a breakdown of key personnel to SOPO tasks (manpower matrix). The matrix should illustrate estimated labor hours and labor categories (e.g., project manager, principal investigator, etc.) required for each task and shall provide rolled-up total for each period. The same should also be included for any proposed subcontracting or consulting efforts. Discuss the rationale used to develop estimates for labor hours and categories, and subcontracting/consulting efforts.
   3.4. Discuss the availability of facilities and equipment. Identify any major equipment needed for the proposed project which will need to be acquired during the course of the project.

4. ***Previous or On-going Related Work***
   4.1. Describe any linkages to current Federal programs (i.e., DOE, DARPA, DOD, NIST, etc.) and any leverage that may be relevant.
   4.2. Explain any corporate commitments (i.e. the furnishing of in-kind contributions or exceeding of the minimum cost share) or linkages to strategic plans.
   4.3. Discuss if the proposed work will be integrated into any products. Please explain how, which ones and when.

STATEMENT OF PROJECT OBJECTIVES (SOPO)

The Department of Energy's National Energy Technology Laboratory uses a specific format for Statement of Project Objectives in its awards. In Announcements such as this one, where the Government does not provide a Statement of Project Objectives, the Applicant is to provide one, which the DOE will then use to generate the Statement of Project Objectives to be included in the award. Several specific tasks have also been provided in the following format for the Applicant to insert into the Statement of Project Objectives at the appropriate location.

The project narrative must contain a single, detailed Statement of Project Objectives that addresses how the project objectives will be met. The Statement of Project Objectives must contain a clear, concise description of all activities to be completed during project performance and follow the structure discussed below. The Statement of Project Objectives may be released to the public by DOE in whole or in part at any time. It is therefore required that it shall not contain proprietary or confidential business information.

The Statement of Project Objectives is generally 3 to 4 pages in total for the proposed work. The Statement of Project Objectives is considered to be part of the Project Narrative and is therefore included in the 30 page limit. Applicants shall prepare the Statement of Project Objectives in the following format:

FORMAT FOR STATEMENT OF PROJECT OBJECTIVES

TITLE OF WORK TO BE PERFORMED

(Insert the title of work to be performed. Be concise and descriptive.)

A. OBJECTIVES

Include one paragraph on the overall objective(s) of the work. Also, include objective(s) for each phase of the work.

B. SCOPE OF WORK

This section should not exceed one-half page and should summarize the effort and approach to achieve the objective(s) of the work for each Phase.

C. TASKS TO BE PERFORMED

Tasks, concisely written, should be provided in a logical sequence and should be divided into the phases of the project. This section provides a brief summary of the planned approach to this project.

PHASE I

Task 1.0 - (Title)

(Description)

Subtask 1.1 (Optional)

(Description)

Task 2.0 - (Title)

PHASE II (Optional)

Task 3.0 - (Title)

D. DELIVERABLES

The periodic, topical, and final reports shall be submitted in accordance with the attached "Federal Assistance Reporting Checklist" and the instructions accompanying the checklist.

[Note: The Recipient shall provide a list of deliverables other than those identified on the "Federal Assistance Reporting Checklist" that will be delivered. These reports shall also be identified within the text of the Statement of Project Objectives. See the following examples:

1. Task 1.1 - (Report Description)
2. Task 2.2 - (Report Description)]

In addition to reports listed in the Federal Assistance Reporting Checklist in Exhibit A hereof, the Recipient shall submit the following to the DOE Project Officer. Note that the following is not to be submitted through the official NETL AAD document control system:

Monthly Highlight Communications: This update shall be submitted via e-mail no later than the 15th day of each month and shall cover the activities of the previous month. Recipients shall use this highlight opportunity to communicate developments, achievements, changes and problems. The information shall be submitted in accordance with the following format:

Award Number
Title
Communication Period – Identify month and year of the communication period.
Task Update – Provide an update on work performed for each task during the period. Identify tasks by both the descriptive name and number.
Quarterly Expanded Summary - Monthly Highlight Communications for December, March, June, and September shall include an expanded summary of project results and the current status of all project tasks. This summary shall be in sufficient detail to place the information communicated in the Monthly Highlight Communications for the current month and preceding two months in the context of the full project.
Discussion Topics – Identify issues that require DOE Project Manager attention or action.
Key Milestones and Significant Accomplishments – In a short paragraph per milestone or accomplishment, identify achievement of key project milestones, noteworthy advancements in research, design, manufacture or commercialization activities of the project, patent-related developments, and important breakthroughs that resolve critical science and technology risks or development barriers.
Presentations & Publications – Identify and include briefing packages, press releases, articles, and papers planned, developed and/or given that discuss the project. [Note: Copies of these presentations and publications provided with the Monthly Highlight Communication shall not include proprietary information.]
Site Visits – Identify site visits planned and given with high level corporate or government officials.
Travel – Identify travel planned or completed to accomplish/manage project tasks.

E. BRIEFINGS/TECHNICAL PRESENTATIONS (If applicable)

The Recipient shall prepare detailed briefings for presentation to the DOE Project Officer at the NETL facility located in Pittsburgh, PA or Morgantown, WV. Briefings shall be given by the Recipient to explain the plans, progress, and results of the technical effort.

The Recipient shall provide and present a technical paper(s) at the DOE/NETL Annual Contractor's Review Meeting to be held at the NETL facility located in Pittsburgh, PA; Morgantown, WV; or other location specified by the DOE Project Officer.

4.11 CERTIFICATIONS/ASSURANCES/REPRESENTATIONS FILE (DEC 2003)

Applicants must complete the DOE certifications/assurances/representations information. *Save this information in a single Word file named "CERTIFICATIONS-ASSURANCES.doc."*

The DOE Certifications, Assurances and Representations are located in one file titled "CERTIFICATIONS-ASSURANCE.doc" and are posted with this Announcement on the IIPS site.

This program is covered under Title XX through XXIII of the Energy Policy Act (EPACT) of 1992. If an applicant is a business entity other than an organization of the type described in 501(c)(3) of the Internal Revenue Code of 1954, the applicant must complete the form set with the EPACT Representation and provide the appropriate EPACT Representation, (i.e., EPACT Representation for Awards Under $100,000 or EPACT Representation for Awards of $100,000 or more).

4.12 ATTACHMENT 1 FFRDC ATTACHMENT (DEC 2003)

FFRDC Budgets and a DOE Field Work Proposal in accordance with the requirements in DOE Order412.1 Work Authorization System, (http://www.directives.doe.gov/pdfs/doe/doetext/neword/412/o4121.pdf) must be provided.

Save these as a Word file and named "FFRDC ATTACHMENT.doc."

4.13 ATTACHMENT 2 BIOGRAPHICAL SKETCH (DEC 2003)

Provide a biographical sketch for the project director/principal investigator, co-project directors/principal investigators, and other roles critical to project success. *Save this information in a single Word file, named "BIO ATTACHMENT.doc".* The biographical information must not exceed 2 pages for each person when printed on 8.5" by 11" paper with 1 inch margins (top, bottom, left, and right) with font not smaller than 11 point and must include:

Education: Undergraduate, graduate and postdoctoral training, provide institution, major/area, degree and year.

Positions: Beginning with the current position list, in chronological order, professional/academic positions with a brief description.

Publications: A list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address if available electronically.

Patents, copyrights and software systems developed may be provided in addition to or substituted for publications.

Synergistic Activities: List no more than 5 professional and scholarly activities related to the effort proposed.

4.14 ATTACHMENT 3 COMMITMENT LETTERS FROM THIRD PARTIES CONTRIBUTING TO COST SHARING (OCT 2003)

If a third party, (i.e., a party other than the organization submitting the application) proposes to provide all or part of the required cost sharing, the applicant must include a letter from the third party stating that it is committed to providing a specific minimum dollar amount of cost sharing. The letter should also identify the proposed cost sharing (e.g., cash, services, and/or property) to be contributed. Letters must be signed by the person authorized to commit the expenditure of funds by the entity and be provided in a PDF format.

Save this information in a file named "CLTP ATTACHMENT.PDF."

4.16 MORE THAN ONE APPLICATION (JAN 2003)

You may submit more than one application, but do not submit an identical application under more than one Area of Interest. Each application must have its own unique title on the subject line (i.e., project title and principal investigator/project director, if any). For each application, you must first click on "Create Application" and then complete the information requested.

4.17 APPLICATION DUE DATE (OCT 2003)

Applications and amendments of applications must be received by April 15, 2004, not later than 8:00 PM Eastern Time. You are encouraged to transmit your application well before the deadline as actual transmissions can take longer than expected based on file size.

APPLICATIONS, INCLUDING APPLICATION FILES, RECEIVED AFTER THE DEADLINE, AS DEMONSTRATED BY THE IIPS DATE/TIME STAMP WILL NOT BE REVIEWED OR CONSIDERED FOR AWARD.

4.18 INTERGOVERNMENTAL REVIEW - NONE (OCT 2003)

This program is not subject to Executive Order 12372, "Intergovernmental Review of Federal Programs".

4.19 FUNDING RESTRICTIONS (DEC 2003)

COST PRINCIPLES

Cost must be allowable in accordance with the applicable cost principles referenced in 10 CFR Part 600.

PRE-AWARD COSTS

Recipients may charge to an award resulting from this announcement pre-award costs that were incurred within the ninety (90) calendar day period immediately preceding the effective date of the award, if the costs are necessary for the conduct of the project activities and are otherwise allowable in accordance with the applicable cost principles and the terms and conditions of the award. Recipients must obtain the prior approval of the contracting officer for any pre-award costs that are for periods greater than this 90 day calendar period.

Pre-award costs are incurred at the applicant's risk. DOE is under no obligation to reimburse such costs if for any reason the applicant does not receive an award or if the award is made for a lesser amount than the applicant expected.

FOREIGN TRAVEL

Cost of foreign travel is not allowable under an award made as a result of this announcement.

4.20 OTHER SUBMISSION REQUIREMENTS (OCT 2003)

ELECTRONIC SUBMISSION

Applications must be submitted through the DOE Industry Interactive Procurement System (IIPS) at http://e-center.doe.gov. Instructions on how to submit an application or an application amendment and how to register, submit questions, and view questions and answers are located on the web site at http://e-center.doe.gov , click on the "Help" button and click on "Frequently Asked Questions".

Prepare all the required files in accordance with the instructions in this announcement prior to starting the transmission process. Submit the entire application package in one IIPS session (i.e., do not logoff before all the files are submitted).

When you are ready to submit your application, go to http://e-center.doe.gov and complete the IIPS cover page. Enter the project title and the principal investigator/project director, if any, in the "Subject" block. Then attach each file in the corresponding block in accordance with the IIPS guidance. Follow the instructions for submitting the application.

If you have any problems accessing information or submitting your application, contact the Help Desk at 1 800-683-0751 and select option 1, or send an email to HelpDesk@pr.doe.gov. ONLY APPLICATIONS SUBMITTED THROUGH IIPS WILL BE CONSIDERED FOR AWARD.

ELECTRONIC SIGNATURE

Applications submitted through IIPS constitute submission of electronically signed applications. The name of the authorized organizational representative (i.e., the administrative official, who, on behalf of the proposing

organization, is authorized to make certifications and assurances or to commit the applicant to the conduct of a project) must be typed in the signature block on the form to be accepted as an electronic signature. Do not submit a scanned copy of the signed document.

IIPS REGISTRATION

In order to submit an application, you must be authorized by the applicant (i.e., institution or business entity) to submit an application on its behalf and you must register in IIPS. You are encouraged to register as soon as possible. You only have to register once to apply for any DOE award. To register go to http://e-center.doe.gov and follow the registration instructions.

SECTION V - APPLICATION REVIEW INFORMATION

5.1 INITIAL REVIEW CRITERIA (OCT 2003)

Prior to a comprehensive merit evaluation, DOE will perform an initial review to determine that (1) the applicant is eligible for an award; (2) the information required by the announcement has been submitted; (3) all mandatory requirements are satisfied; and (4) the proposed project is responsive to the objectives of the funding opportunity announcement.

5.2 MERIT REVIEW CRITERIA (OCT 2003)

Applications submitted in response to this funding opportunity will be evaluated and scored in accordance with the criteria and weights listed below:

1. TECHNICAL APPROACH (CRITERION 1) – 40%

- Validity of the proposed approach, the likelihood of success, and the scientific merit of the key technology issues addressed.
- Technical realism and likelihood of success of the proposed technical milestones for each interval of the effort.
- Feasibility of the proposed Statement of Project Objectives (SOPO) and the anticipated outcomes and results; validity of the proposed roles and responsibilities of each participant.
- The extent to which the proposed project will contribute to the eventual achievement of DOE's SSL mission and/or goal.

2. TECHNOLOGY "VALUE" (CRITERION 2) – 30%

- The extent to which the proposed approach will contribute to multiple SSL technologies or how it may positively impact other DOE energy efficiency objectives (crosscutting).
- The importance of the proposed work and its potential impact on eventual SSL products.
- The degree to which the proposed work meets the published statement of needs.
- Feasibility of the proposed work allowing DOE to achieve the SSL goals earlier than planned.
- The feasibility of the proposed technology dissemination to a cross-section of end users and the proposed licensing strategies and plans to overcome any licensing barriers.

3. APPLICANT AND TEAM MEMBERS ROLES AND CAPABILITIES (CRITERION 3) – 20%

- Adequacy of the proposed team's abilities to achieve the goals stated in the SOPO.
- Demonstrated abilities to successfully perform project management functions on previous programs, Federal or non-Federal.
- Reasonableness of time allocations outlined in the manpower matrix; effectiveness of the proposed roles and responsibilities of outlined personnel.
- The adequacy (quality, availability, and appropriateness) of facilities and equipment to accommodate the proposed project.

4. PREVIOUS OR ON-GOING RELATED WORK (CRITERION 4) – 10%

- Linkages to current Federal Programs (i.e., DOE, DARPA, DOD, NIST, etc.) and any leverage that may be relevant.
- Potential benefits of any corporate commitments (i.e. in-kind cost sharing or exceeding of the minimum cost share) or linkages to strategic plans.
- Feasibility of potential benefits the proposed work has with anticipated products.

5.3 OTHER SELECTION FACTORS (OCT 2003)

These factors, while not indicators of the Application's merit, e.g., technical excellence, cost, Applicant's ability, etc., may be essential to the process of selecting the application(s) that, individually or collectively, will best achieve the program objectives. Such factors are often beyond the control of the Applicant. Applicants should recognize that some very good applications may not receive an award because they do not fit within a mix of projects which maximizes the probability of achieving the DOE's overall research and development objectives. Therefore, the following Program Policy Factors may be used by the Selection Official to assist in determining which of the ranked application(s) shall receive DOE funding support.

1. It may be desirable to select for award a group of projects which represents a diversity of technical approaches and methods;

2. It may be desirable to support complementary and/or duplicative efforts or projects, which, when taken together, will best achieve the research goals and objectives;

3. It may be desirable to select different kinds and sizes of organizations in order to provide a balanced programmatic effort and a variety of different technical perspectives;

4. It may be desirable, because of the nature of the energy source, the type of projects envisioned, or limitations of past efforts, to select a group of projects with a broad or specific geographic distribution.

5. It may be desirable to select project(s) of less technical merit than other project(s) if such a selection will optimize use of available funds by allowing more projects to be supported and not be detrimental to the overall objectives of the program.

The above factors will be independently considered by the Selection Official in determining the optimum mix of applications that will be selected for support. These policy factors will provide the Selection Official with the capability of developing, from the competitive funding opportunity, a broad involvement of organizations and organizational ideas, which will both enhance the overall technology research effort and upgrade the program content to meet the goals of the DOE.

5.4 REVIEW AND SELECTION PROCESS (OCT 2003)

MERIT REVIEW

Applications that pass the initial review will be subjected to a merit review in accordance with the Office of Energy Efficiency and Renewable Energy merit review procedures which were published in the Federal Register on December 20, 2001 (Vol. 66, No. 245).

SELECTION

The Selection Official will consider the merit review recommendation, program policy factors, and the amount of funds available.

DISCUSSIONS AND AWARD

The Government may enter into discussions with a selected applicant for any reason deemed necessary, including but not limited to,: (1) the budget is not appropriate or reasonable for the requirement; (2) only a portion of the application is selected for award; (3) the Government needs additional information to determine that the recipient is capable of complying with the requirements in 10 CFR 600; and/or (4) special terms and conditions are required. Failure to resolve satisfactorily the issues identified by the Government will preclude award to the applicant.

5.5 ANTICIPATED ANNOUNCEMENT AND AWARD DATES (OCT 2003)

DOE anticipates notifying applicants selected for award by July 2004 and making awards by September 2004.

SECTION VI - AWARD ADMINISTRATION INFORMATION

6.1 AWARD NOTICES (OCT 2003)

NOTICE OF SELECTION

DOE will notify applicants selected for negotiations leading to award. This notice of selection is not an authorization to begin performance. (See Section IV, Article 4.19 with respect to the allowability of pre-award costs.)

Organizations whose applications have not been selected will be advised as promptly as possible. This notice will explain why the application was not selected.

NOTICE OF AWARD

A Notice of Financial Assistance Award issued by the contracting officer is the authorizing award document. It includes, either as an attachment or by reference: (1) a budget that indicates the amounts, by categories of expenses, on which the agency has based its support; (2) the application; (3) applicable program regulations, if any; (4) special terms and conditions; (5) DOE assistance regulations at 10 CFR part 600, or, for Federal Demonstration Partnership (FDP) institutions, the FDP terms and conditions; and (6) a reporting checklist, which identifies the reporting requirements.

6.2 ADMINISTRATIVE AND NATIONAL POLICY REQUIREMENTS (OCT 2003)

The administrative requirements and national policy requirements (e.g., "generally applicable requirements") for DOE grants and cooperative agreements are contained in 10 CFR Part 600, except for grants made to Federal Demonstration Partnership (FDP) institutions. The FDP terms and conditions and DOE FDP agency specific terms and conditions are located on the National Science Foundation web site at www.nsf.gov. "Generally applicable requirements" are defined in 10 CFR 600.12.

6.3 LOBBYING RESTRICTION (INTERIOR ACT, 2003) (JULY 2003)

The awardee agrees that none of the funds obligated on this award shall be made available for any activity or the publication or distribution of literature that in any way tends to promote public support or opposition to any legislative proposal on which Congressional action is not complete. This restriction is in addition to those prescribed elsewhere in statute and regulation.

A copy of the DOE "Lobbying Brochure" which provides a summary of the statutory and regulatory restrictions regarding lobbying activities for Federal contractors can be found at

http://professionals.pr.doe.gov/ma5/MA-5Web.nsf/Procurement/Lobbying+Brochure?OpenDocument

6.4 NOTICE REGARDING THE PURCHASE OF AMERICAN-MADE EQUIPMENT AND PRODUCTS -- SENSE OF CONGRESS (JULY 2003)

It is the sense of the Congress that, to the greatest extent practicable, all equipment and products purchased with funds made available under this award should be American-made.

6.5 COMPLIANCE WITH BUY AMERICAN ACT (JULY 2003)

In accepting this award, the Recipient agrees to comply with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a-10c, popularly known as the "Buy American Act"). The Recipient should review the provisions of the Act to ensure that expenditures made under this award are in accordance with it.

6.6 REPORTING (NOV 1998)

Failure to comply with the reporting requirements contained in this award will be considered a material noncompliance with the terms of the award. Noncompliance may result in a withholding of future payments, suspension or termination of the current award, and withholding of future awards. A willful failure to perform, a history of failure to perform, or of unsatisfactory performance of this and/or other financial assistance awards, may also result in a debarment action to preclude future awards by Federal agencies.

6.7 ENVIRONMENTAL, SAFETY & HEALTH (OCT 2003)

The recipient must comply with applicable Federal, State, and local environmental, safety and health laws and regulations for work performed under this award.

6.8 NOTICE REGARDING UNALLOWABLE COSTS AND LOBBYING ACTIVITIES (NOV 1998)

Recipients of financial assistance are cautioned to carefully review the allowable cost and other provisions applicable to expenditures under their particular award instruments. If financial assistance funds are spent for purposes or in amounts inconsistent with the allowable cost or any other provisions governing expenditures in an award instrument, the government may pursue a number of remedies against the Recipient, including in appropriate circumstances, recovery of such funds, termination of the award, suspension or debarment of the Recipient from future awards, and criminal prosecution for false statements.

Particular care should be taken by the Recipient to comply with the provisions prohibiting the expenditure of funds for lobbying and related activities. Financial assistance awards may be used to describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not to encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

6.9 STATEMENT OF SUBSTANTIAL INVOLVEMENT (AUG 2003)

RECIPIENT'S RESPONSIBILITIES. The Recipient is responsible for:

Performing the activities supported by this award, including providing the required personnel, facilities, equipment, supplies and services;

Defining approaches and plans, submitting the plans to DOE for review, and incorporating DOE comments;

Managing and conducting the project activities, including, if applicable, coordinating with a DOE M&O contractor on activities performed under the M&O contract that are related to the project;

Attending program review meetings as required and reporting project status;

Submitting technical reports and incorporating DOE comments; and;

Presenting the project results at appropriate technical conferences or meetings as directed by the DOE Project Officer.

DOE RESPONSIBILITIES. DOE is responsible for:

Reviewing in a timely manner project plans, including technology transfer plans, and redirecting the work effort if the plans do not address critical programmatic issues;

Conducting program review meetings as needed to ensure adequate progress and that the work accomplishes the program and project objectives. Redirecting work or shifting work emphasis, if needed;

Promoting and facilitating technology transfer activities, including disseminating program results through

presentations and publications; and

Serving as scientific/technical liaison between awardees and other program or industry staff.

6.10 REPORTING REQUIREMENTS (DEC 2003)

The Reporting Requirements are identified on the Federal Assistance Reporting Checklist attached to the award agreement. See Exhibit A for the proposed Checklist for this program.

SECTION VII - AGENCY CONTACTS

7.1 QUESTIONS (OCT 2003)

Questions regarding the content of the announcement should be submitted through the "Submit Question" feature of the DOE Industry Interactive Procurement System (IIPS) at http://e-center.doe.gov. Locate the announcement on IIPS and then click on the "Submit Question" button. Enter required information. You will receive an electronic notification that your question has been answered. DOE will try to respond to a question within 3 business days, unless a similar question and answer have already been posted on the website.

Responses to questions may be viewed through the "View Questions" feature, button. If no questions have been answered, a statement to that effect will appear. You should periodically check "View Questions" for new questions and answers.

Questions regarding how to submit questions or view responses can be e-mailed to the IIPS HELP Desk at helpdesk@pr.doe.gov or by calling 1 (800) 683-0751.

SECTION VIII - OTHER INFORMATION

8.1 MODIFICATIONS (OCT 2003)

Notices of any modifications to this announcement will be posted on the DOE Industry Interactive Procurement System (IIPS).

If you register in IIPS, you may "Join the Mailing List" to receive an email when a modification or an announcement message is posted. To view modifications and announcement messages, locate the announcement on IIPS and click on the yellow folder next to the announcement number.

8.2 GOVERNMENT RIGHT TO REJECT OR NEGOTIATE (OCT 2003)

DOE reserves the right, without qualification, to reject any or all applications received in response to this announcement and to select any application, in whole or in part, as a basis for negotiation and/or award.

8.3 COMMITMENT OF PUBLIC FUNDS (OCT 2003)

The Contracting Officer is the only individual who can make awards or commit the Government to the expenditure of public funds. A commitment by other than the Contracting Officer, either explicit or implied, is invalid.

8.4 PROPRIETARY APPLICATION INFORMATION (OCT 2003)

An application may include data, including trade secrets and/or privileged or confidential commercial or financial information which the applicant does not want disclosed to the public or used for any purpose other than evaluation of the application (See 10 CFR 600.15). The use and disclosure of such data may be restricted, provided the applicant marks the cover sheet of the application with the following legend and specifies the pages of the application which are to be restricted:

> "The data contained in pages [ ] of this application have been submitted in confidence and contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data herein to the extent provided in the award. This restriction does not limit the government's right to use or disclose data obtained without restriction from any source, including the applicant."

To protect such data, each line or paragraph on the pages containing such data must be specifically identified and marked with a legend similar to the following:

"Use or disclosure of the data set forth above is subject to the restriction on the cover page of this application."

8.5 EVALUATION BY NON-FEDERAL REVIEWERS (OCT 2003)

In conducting the merit review evaluation, the Government plans to use qualified non Federal personnel (e.g., DOE management and operating contractors, universities personnel, or other scientific/technical experts) as reviewers or advisors. The applicant, by submitting its application, consents to the use of non-Federal reviewers. Non-Federal reviewers will be required to sign a Conflict-of-Interest/Non-Disclosure Certificate prior to reviewing any application.

8.6 INTELLECTUAL PROPERTY DEVELOPED UNDER THIS PROGRAM (OCT 2003)

PATENT RIGHTS

The government will have certain statutory rights in an invention that is conceived or first actually reduced to

practice under a DOE award. 42 U.S.C. 5908 provides that title to such inventions vests in the United States, except where 35 U.S.C. 202 provides otherwise for nonprofit organizations or small business firms. However, the Secretary of Energy may waive all or any part of the rights of the United States subject to certain conditions. (See the clause entitled "Notice of Right to Request Patent Waiver" below.)

RIGHTS IN TECHNICAL DATA

Normally, the government has unlimited rights in technical data created under a DOE agreement. Delivery or third party licensing of proprietary software or data developed solely at private expense will not normally be required except as specifically negotiated in a particular agreement to satisfy DOE's own needs or to insure the commercialization of technology developed under a DOE agreement.

SPECIAL PROTECTED DATA STATUTES

This program is covered by a special protected data statute. The provisions of the statute provide for the protection from public disclosure, for a period of up to 5 years from the development of the information, data that would be trade secret, or commercial or financial information that is privileged or confidential, if the information had been obtained from a non-Federal party. Generally, the provision entitled, Rights in Data Programs Covered under Special Protected Data Statutes, (10 CFR 600 Appendix A to Subpart D), would apply to an award made under this announcement. This provision will identify data or categories of data first produced in the performance of the award that will be made available to the public, notwithstanding the statutory authority to withhold data from public dissemination, and will also identify data that will be recognized by the parties as protected data.

INTELLECTUAL PROPERTY PROVISIONS

The standard DOE financial assistance intellectual property provisions applicable to the various types of recipients are located at http://www.gc.doe.gov/gcmain.html.

8.7 NOTICE OF RIGHT TO REQUEST PATENT WAIVER (OCT 2003)

Applicants may request a waiver of all or any part of the rights of the United States in inventions conceived or first actually reduced to practice in performance of an agreement as a result of this announcement, in advance of or within 30 days after the effective date of the award. Even if such advance waiver is not requested or the request is denied, the recipient will have a continuing right under the award to request a waiver of the rights of the United States in identified inventions, i.e., individual inventions conceived or first actually reduced to practice in performance of the award. Any patent waiver that may be granted is subject to certain terms and conditions in 10 CFR 784.

Domestic small businesses and domestic nonprofit organizations will receive the patent rights clause at 37 CFR 401.14, i.e., the implementation of the Bayh-Dole Act. This clause permits domestic small business and domestic nonprofit organizations to retain title to subject inventions. Therefore, small businesses and nonprofit organizations do not need to request a waiver.

Each patent waiver granted by DOE shall contain a provision requiring the recipient to offer to each of the Solid State Lighting Industrial Product Development (i.e., SSL Partnership and SSL Industry) members the option to enter into a non-exclusive license for subject inventions developed under the Core Technologies Program, upon terms that are reasonable under the circumstances, including royalties. After a one-year period, the Core recipient will be free from the licensing restrictions. The Core recipient must agree to negotiate in good faith with any and all Industrial Product Development members that indicate a desire to obtain at least a non-exclusive license. Exclusive licensing may be considered if only one Industrial Product Development member expresses an interest in licensing the invention. Partially exclusive licenses in a defined field of use may be granted to an Industrial Product Development member, provided such license would not preclude any other Industrial Product Development member that indicates a desire to license the invention from being granted at least a non-exclusive license. In the event the Core Recipient and an Industrial Product Development member cannot reach agreement after nine months from the start of diligent and responsible negotiations between them, the Industrial Product Development member shall have the right of a third party beneficiary to maintain an action in a court of competent jurisdiction to force licensing of the subject

invention on reasonable terms and conditions. The licensing of any background patents owned by the Core recipient is not required.

8.8 EXCEPTIONAL CIRCUMSTANCES

Regarding any award made to domestic small businesses, institutions of higher education, or other non-profit organizations under this announcement, the Department of Energy intends to pursue a determination titled "Exceptional Circumstances Determination for Inventions Arising Under the Solid State Lighting Core Technologies Program." This Determination will be based on the Department's belief that circumstances surrounding the Solid State Lighting Core Technologies Program are exceptional and justify modified intellectual property arrangements as allowed by the Bayh-Dole Act (35 U.S.C. 202(a)(ii)). The Determination is currently being prepared by NETL and a draft version will be issued as an Amendment as soon as it is available.

If the Determination is approved, the Department of Energy intends that disposition of rights to subject inventions made by domestic small businesses and non-profit entities under awards resulting from this announcement will be subject to the terms of this Determination. The restriction of patent rights under the Determination will be basically as described in the last paragraph of Article 8.7 above. In developing the Determination, the Department will strive to minimize the licensing rights that the Core Technology Program recipients will have to agree to. In addition, under 35 U.S.C. § 203(2), an awardee adversely affected by this exceptional circumstance determination has a right to appeal the determination to the Department of Energy or to the United States Court of Federal Claims.

8.9 NOTICE REGARDING ELIGIBLE/INELIGIBLE ACTIVITIES (AUG 1999)

Eligible activities under this program include those which describe and promote the understanding of scientific and technical aspects of specific energy technologies, but not those which encourage or support political activities such as the collection and dissemination of information related to potential, planned or pending legislation.

NETL F 540.3-1#
(11/2001) OPI=PS10
(Previous Editions Obsolete)

EXHIBIT A .FEDERAL ASSISTANCE REPORTING CHECKLIST

1. AWARDEE: TBD	2. IDENTIFICATION NUMBER: TBD

3. REPORT SUBMISSION ADDRESS: *The requested quantity of all required report deliverables shall be submitted to the following address:*

NETL AAD DOCUMENT CONTROL, BLDG. 921
U.S. DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY
P.O. BOX 10940
PITTSBURGH, PA 15236-0940
FITS@NETL.DOE.GOV

4. PLANNING AND REPORTING REQUIREMENTS:

	FORM N0.	FREQ.	NUMBER OF COPIES
A. PROGRAM/PROJECT MANAGEMENT			
☐ Federal Assistance Program/Project Status Report	DOE F 4600.6		
☒ Financial Status Report	SF-269 or SF-269A	Q, FG	Electronic Version
☐ Federal Cash Transaction Report	SF-272		
B. TECHNICAL (One paper copy and one PDF electronic file copy)			
☐ Technical Progress Report	None		
☒ Topical Report	None	A	Electronic Version
☒ Final Report	None	FG	Electronic Version
C. ENVIRONMENTAL			
☒ Hazardous Substance Plan	None	O, C	Electronic Version
☒ Hazardous Waste Report	None	FC	Electronic Version
☐ Environmental Compliance Plan	None		
☐ Environmental Monitoring Plan	None		
☐ Environmental Status Report	None		
D. PROPERTY			
☐ Annual Report of Property in the Custody of Contractors	F 580.1-8		
☐ High Risk Property Report	F 580.1-25		
☒ Report of Termination or Completion Inventory	NETL F 580.1-9 and SF-120	FC	Electronic Version
E. EXCEPTION			
☐ Conference Record	None		
☒ Hot Line Report	None	A	Electronic Version
☒ Journal Articles/Conference Papers and Proceedings	None	A	Electronic Version
☐ Software			
☐ Other _____			

5. FREQUENCY CODES AND DUE DATES:

A - As required; see attached text for applicability.
C - Change/revision, within 15 calendar days after event.
FG - Final; within ninety (90) calendar days after the project period ends.
FC - Final - End of Effort.
M - Monthly; within twenty-five (25) calendar days after end of the report period.
O - Once after award; within thirty (30) calendar days after award.
Q - Quarterly; within thirty (30) calendar days after end of the calendar quarter or portion thereof.
S - Semiannually; within thirty (30) calendar days after end of project year and project half-year.
YF - Yearly; 90 calendar days after the end of project year.
YP - Yearly Property - due 15 days after period ending 9/30.

6. SPECIAL INSTRUCTIONS:

The forms identified in the checklist are available at **http://www.netl.doe.gov/business/faapiaf/paaforms.html**. Alternate formats are acceptable provided the contents remain consistent with the form.

A.1 ELECTRONIC MEDIA STANDARD FOR PREPARATION OF TECHNICAL REPORTS (DEC 1999)

FILE FORMAT

Production of high-quality electronic documents is dependent on the quality of the input that is provided. Thus, the Recipient shall an electronic version of each report.

ELECTRONIC REPORTS SHALL BE SUBMITTED IN THE ADOBE ACROBAT PORTABLE DOCUMENT FORMAT (PDF). ELECTRONIC REPORTS SUBMITTED IN A FORMAT OTHER THAN ADOBE WILL BE RETURNED AND THE REPORT CONSIDERED DELINQUENT.

Each report shall be an integrated file that contains all text, tables, diagrams, photographs, schematics, graphs, and charts.

SUBMISSION FORMAT

The electronic file(s) shall be submitted via the Internet, diskette or CD-ROM. Diskettes or CD-ROMs must be labeled as follows:

DOE Award Number
Type/Frequency of Report(s)
Reporting Period (if applicable)
Name of submitting organization
Name, phone number and fax number of preparer

Internet – At the Recipient's discretion, electronic transmission of documents may be submitted via the Internet to the address identified on the Federal Assistance Reporting Checklist.

Diskettes -- Diskettes must be 3.5" double-sided, high-density (1.4 M Byte capacity). If file compression software is used to transmit a PDF file spanning more than one diskette, PKZIP from PKWare, Inc., is the required compression software. State the number of diskettes in the set (e.g., 1/3)

CD-ROM -- The electronic file(s) may be submitted on an ISO9660-format CD-ROM.

FILE NAMING

In naming the electronic file, the Recipient shall use the standard eight-character naming convention for the main file name, and the three character extension applicable to the software use, e.g., .PDF for Adobe.

For the main file name, the first five characters are the last five digits from the award number; e.g., for Award Number DE-FG26-97NT12345, the first five characters are 12345.

The next character represents the technical report and will always be designated as "R".

The remaining two characters indicate the chronological number of the particular type of report; e.g., Quarterly Technical Progress Reports for a 5-year award are numbered R01 through R20. Thus, the main file name for the sixth Quarterly Technical Progress Report under Award No. DE-FG26-99NT12345 would be 12345R06.PDF. If monthly, quarterly, annual, and a final technical report are required, the numbers would run from R01 through R86 (60 monthly reports, 20 quarterly reports, 5 annual reports, and 1 final report).

A.2 GENERAL INSTRUCTIONS FOR THE PREPARATION AND SUBMISSION OF REPORTS (MAY 1999)

The Recipient shall prepare and submit the plans and reports indicated on the "Federal Assistance Reporting Checklist" to the addressee identified on the checklist. The level of detail the Recipient provides in the plans and reports shall be commensurate with the scope and complexity of the effort and shall be as delineated in the guidelines and instructions contained herein. The prime Recipient shall be responsible for acquiring data from any contractors or sub-recipients to ensure that data submitted are compatible with the data elements which prime Recipients are required to submit to DOE.

A.3 FINANCIAL STATUS REPORT (STANDARD FORM 269 OR 269A) (FEB 2002)

This report is used for the Recipient to provide regular periodic accounting of project funds expended. The accounting may be on either a cash or accrual basis. Actual total expenditures and obligations incurred, but not paid, are reported for each reporting period for each major activity. Provision is made to identify the Federal and non-Federal share of project outlays for each identified activity.

A.4 TECHNICAL REPORTS (INCLUDES TECHNICAL PROGRESS REPORTS, FINAL REPORT AND TOPICAL REPORTS) (JAN 2004)

CAUTION: In order to assure that the technical report deliverables under this award are submitted in a publicly releasable form, the following guidance shall be followed.

If this award DOES NOT include Alternate I to the Rights in Data clause, the Recipient SHALL NOT include Limited Rights Data (as defined in the Rights in Data clause) in any report or other document delivered to the Government under this award. In accordance with paragraph (h) of the Rights in Data clause, form, fit and function data SHALL be supplied in the sanitized report in lieu of any Limited Rights Data.

If this award DOES include Alternate I to the Rights in Data clause, any Limited Rights Data (as defined in the Rights in Data clause) to be delivered shall be submitted in a SEPARATE APPENDIX to the technical report. This appendix SHALL NOT be submitted in an electronic format but rather TWO GOOD QUALITY PAPER COPIES SHALL BE PROVIDED. The appendix SHALL NOT be referenced in the sanitized technical report. In accordance with the Rights in Data clause, the appendix SHALL be marked ONLY with the authorized Limited Rights Notice. An electronic version of the sanitized technical report shall be submitted in accordance with the Federal Assistance Reporting Checklist (the technical report shall then be submitted on diskette or CD only, not via internet). In accordance with paragraph (h) of the Rights in Data clause, form, fit and function data SHALL be supplied in the sanitized report in lieu of any Limited Rights Data.

Further, if this award includes the clause titled "Rights in Data-Programs Covered Under Special Data Statutes," which authorizes the Recipient to request protection from public disclosure for a limited period of time for certain information developed under this award, such Protected Data shall be submitted in a SEPARATE APPENDIX to the technical report. This appendix shall be suitable for release after the agreed upon period of protection from public disclosure has expired. The appendix SHALL NOT be submitted in an electronic format but rather shall be submitted in TWO GOOD QUALITY PAPER COPIES. The appendix SHALL NOT be referenced in the sanitized technical report. In accordance with paragraph (g)(1) of the data clause, the appendix SHALL be marked ONLY with the authorized Protected Rights Notice. An electronic version of the sanitized technical report shall be submitted in accordance with the Federal Assistance Reporting Checklist (the technical report shall then be submitted on diskette or CD only, not via internet).

A.5 TOPICAL REPORT (MAY 1999)

These reports usually provide a comprehensive statement of the technical results of the work performed for a specific task or subtask of the Statement of Project Objectives, or detail significant new scientific or technical advances. If required, DOE shall review and approve the report outline prior to submission of the report.

A.6 FINAL TECHNICAL REPORT (AUG 2000)

The Final Report shall document and summarize all work performed during the award period in a comprehensive manner. It shall also present findings and/or conclusions produced as a consequence of this work. This report shall not merely be a compilation of information contained in subsequent quarterly, or other technical reports, but shall present that information in an integrated fashion, and shall be augmented with findings and conclusions drawn from the research as a whole.

A.7 GUIDELINES FOR ORGANIZATION OF TECHNICAL REPORTS (SEPT 2003)

The following sections should be included (as appropriate) in technical reports in the sequence shown. Any section denoted by an asterisk is required in all technical reports.

TITLE PAGE* - The Title Page of the report itself must contain the following information in the following sequence:

Report Title
Type of Report (Quarterly, Semi-Annual, Annual, Topical, Final)
Reporting Period Start Date
Reporting Period End Date
Principal Author(s)
Date Report was Issued (Month [spelled out] and Year [4 digits])
DOE Award Number (e.g., DE-FG26-99NT12345) and if appropriate, task number
Name and Address of Submitting Organization (This section should also contain the name and address of significant subcontractors or sub-recipients who participated in the production of the report.)

DISCLAIMER* -- The Disclaimer must follow the title page, and must contain the following paragraph:

"This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof."

ABSTRACT* - should be a brief, concise summary of the report.

TABLE OF CONTENTS*

LIST(S) OF GRAPHICAL MATERIALS

INTRODUCTION

EXECUTIVE SUMMARY* - this should be a well organized summary that highlights the important accomplishments of the research during the reporting period. It should be no less than one page and no more than two pages in length, and should be single spaced. This summary must be more comprehensive than the traditional "abstract."

EXPERIMENTAL* - this should describe, or reference all experimental methods being used for the research. It should also provide detail about materials and equipment being used. Standard methods can be referenced to the appropriate literature, where details can be obtained. Equipment should be described only if it is not standard, or if information is not available thru the literature or other reference publications.

RESULTS AND DISCUSSION* - It is extremely important that this section includes enough relevant data, especially statistical data, to allow the project manager to justify the conclusions. With the relevant data, explain how the data was interpreted and how it relates to the original purpose of the research. Be concise in the discussion on how this research effort solved or contributed to solving the original problem.

CONCLUSION* - The conclusion should not simply reiterate what was already included in the "Results and Discussion" section. It should, however, summarize what has already been presented, and include any logical implications of how the successes are relevant to technology development in the future. This is extremely important, since "relevancy" continues to be a criterion of the program.

REFERENCES*
BIBLIOGRAPHY
LIST OF ACRONYMS AND ABBREVIATIONS
APPENDICES (IF NECESSARY)

Company Names and Logos -- Except as indicated above, company names, logos, or similar material should not be incorporated into reports.

Copyrighted Material -- Copyrighted material should not be submitted as part of a report unless written authorization to use such material is received from the copyright owner and is submitted to DOE with the report.

Measurement Units -- All reports to be delivered under this instrument shall use the SI Metric System of Units as the primary units of measure. When reporting units in all reports, primary SI units shall be followed by their U.S. Customary Equivalents in parentheses ( ).

The Recipient shall insert the text of this clause, including this paragraph, in all subcontracts under this award.

Note: SI is an abbreviation for "Le Systeme International d'Unites."

A.8 ENVIRONMENTAL (MAR 2003)

In response, in part, to the requirements of the National Environmental Policy Act of 1969 (NEPA), ISO 14001, and other related environmental statutes, the National Energy Technology Laboratory (NETL) requires the submission of various documents that assess the environmental aspects and projected impacts of all of its proposed actions. These documents may include the following: (1) Hazardous Substance Plan; (2) Hazardous Waste Report; (3) Environmental Compliance Plan; (4) Environmental Monitoring Plan; and (5) Environmental Status Reports; and (6) ISO 14001 forms (if applicable).

The environmental information provided in these documents will enable NETL to fulfill its responsibilities under NEPA (additional information about the requirements of the National Environmental Policy Act can be found in the DOE NEPA Compliance Guide and 40 CFR 1021) and to monitor the applicant's compliance with other environmental regulations. The implementation of any task associated with a proposed action will be dependent upon DOE submitting and acquiring approval of necessary NEPA documentation. Therefore, to minimize the risk of project delays, it is imperative that these reports be submitted in a timely manner.

The information contained herein specifies the basic environmental requirements for this procurement action, but it is not to be interpreted as containing all necessary information for any given project. Likewise, certain aspects of the requirements may not be applicable. Accordingly, the level of information provided should be sufficient for DOE to assess the environmental implications of the proposed action.

A.9 HAZARDOUS SUBSTANCE PLAN (MAY 1999)

The Recipient shall submit a Hazardous Substance Plan not later than thirty (30) days after initial award. The Plan shall specifically identify each Hazardous Substance (as defined under 40 CFR 261, Subpart D, entitled "Lists of Hazardous Wastes") anticipated to be purchased, utilized or generated in the performance of this award. For each

such Hazardous Substance identified, the Plan shall specifically provide the following information:

Description of Substance/Chemical
EPA Hazardous Waste Number
EPA Hazard Code
Anticipated Quantity to be purchased, utilized or generated
Anticipated Hazardous Waste Transporter
Anticipated Hazardous Waste Disposal Facility Contractor and Location (City/Municipality, State)
Anticipated Treatment Method

A.10 HAZARDOUS WASTE REPORT (MAY 1999)

The Recipient shall submit a Hazardous Waste Report at the completion of award performance. The Report shall specifically identify each Hazardous Waste (as defined under 40 CFR 261, Subpart D, entitled "Lists of Hazardous Wastes") actually utilized, or generated in the performance of this award. For each such Hazardous Waste identified, the Report shall specifically provide the following information:

Description of Substance/Chemical
EPA Hazardous Waste Number
EPA Hazard Code
Actual Quantity Disposed
Actual Hazardous Waste Transporter
Actual Hazardous Waste Disposal Facility Contractor and Location (City/Municipality, State)
Actual Disposal Date
Actual Treatment Method

The Hazardous Waste Report is intended as a final reconciliation of anticipated versus actual Hazardous Substances purchased, utilized, or generated in the performance of this award.

A.11 PROPERTY REPORTS (DEC 1999)

The NETL Property Handbook entitled "Management of Government Property in the Possession of Contractors," contains forms, instructions, and suggested formats for submission of property reports. This handbook can be found at http://www.netl.doe.gov/business/index.html.

A.12 REPORT OF TERMINATION OR COMPLETION INVENTORY (NETL F 580.1-9 AND SF-120) (SEPT 2000)

This report, submitted on the NETL F 580.1-9, is due immediately upon completion or termination of the award. The SF-120 is also required if there is Government-furnished property involved. The Recipient is required to perform and cause each subcontractor to perform a physical inventory, adequate for disposal purposes, of all Government property applicable to the award.

A.13 HOT LINE REPORT (MAR 2002)

The "Hot Line Report" may be used to report a major break through in research, development, or design; an event causing a significant schedule slippage or cost growth; an environmental, safety and health violation; achievement of or failure to achieve an important technical objective; or any requirement for quickly documented direction or redirection. The report shall be submitted by the most rapid means available, usually electronic, and should confirm telephone conversations with DOE representatives. Identification as a "Hot Line Report" serves notice at each link in the delivery chain that expedition in handling is required. Unless otherwise agreed by the parties involved, DOE is expected to take action and respond in a similarly timely manner. The report should include:

1. Recipient's name and address;
2. Award title and number;
3. Date;

4. Brief statement of problem or event;
5. Anticipated impacts; and
6. Corrective action taken or recommended.

Hot line reports shall document the incidents listed below:

1. Any single fatality or injuries requiring hospitalization of five or more individuals is to be immediately reported.

2. Any significant environmental permit violation is to be reported as soon as possible, but within 24 hours of the discovery of the incident.

3. Other incidents that have the potential for high visibility in the media are to be reported as quickly as possible, but within 24 hours following discovery.

4. Any failure resulting in damage to Government-owned equipment in excess of $50,000 is to be reported as quickly as possible, but within 24 hours of the discovery of the failure.

5. Any unplanned event which is anticipated to cause a schedule slippage or cost increase significant to the project is to be reported within 24 hours.

6. Any verbal or written Notice of Violation of any Environmental, Safety, and Health statutes arising from the performance of this award is to be immediately reported.

7. Any accidental spill or release which is in violation of any Environmental, Safety, and Health statutes arising from the performance of this award is to be immediately reported, but within 24 hours of the discovery of the accident.

8. Any incident which causes a significant process or hazard control system failure, or is indicative of one which may lead to any of the above defined incidents, is to be reported as soon as possible, but within 5 days of discovery.

The requirement to submit Hot Line Reports for the incidents identified in 1, 2, 3, 6, or 7 is for the sole purpose of enabling DOE officials to respond to questions relating to such events from the media and other public.

When an incident is reported in accordance with 4, 5, 6, 7, or 8, the Recipient shall conduct an investigation of its cause and make an assessment of the adequacy of resultant action. A written report is required no later than ten (10) calendar days following the incident and shall include an analysis of the pertinent facts regarding the cause, and a schedule of the remedial events and time periods necessary to correct the action.

When an event results in the need to issue a written or verbal statement to the local media, the statement is to be cleared first; if possible, and coordinated with NETL's Office of Public Affairs, the Contracting Officer Representative (COR) and the Contracting Officer.

A.14 JOURNAL ARTICLES, CONFERENCE PAPERS AND PROCEEDINGS GENERATED BY LARGE BUSINESSES FOR DOE REVIEW (SEPT 2000)

The Recipient shall submit to DOE for review and approval all documents generated by the Recipient, or any subcontractor, which communicate the results of scientific or technical work supported by DOE under this award, whether or not specifically identified in the award, prior to submission for publication, announcement, or presentation. Such documents include journal articles, conference papers and proceedings, etc. Each such document shall be accompanied by a properly completed NETL Form 510.1-5, "Request for Patent Clearance for Release of Contracted Research Documents."

The Recipient shall simultaneously submit a draft version of the document to the DOE COR and the DOE Patent Counsel Office prior to the publication, presentation, or announcement. The document submitted to the DOE Patent

Counsel shall be accompanied by a completed NETL Form 510.1-5. The DOE COR and DOE Patent Counsel shall review the draft version of the document and notify the Recipient of approval or recommended changes. The approved final version shall be submitted to the NETL AAD Document Control Coordinator.

The following information shall be provided for conference papers and proceedings, etc.

-- Name of conference
-- Location of conference (city, state, and country)
-- Date of conference (month/day/year)
-- Conference sponsor

A.15 JOURNAL ARTICLES, CONFERENCE PAPERS AND PROCEEDINGS GENERATED BY A SMALL BUSINESS OR NONPROFIT ORGANIZATION FOR DOE REVIEW (SEPT 2000)

The Recipient shall submit to DOE for review and approval all documents generated by the Recipient, or any subcontractor, which communicate the results of scientific or technical work supported by DOE under this award, whether or not specifically identified in the award, prior to submission for publication, announcement, or presentation. Such documents include journal articles, conference papers and proceedings, etc. Each such document shall be accompanied by a properly completed NETL Form 510.1-5, "Request for Patent Clearance for Release of Contracted Research Documents."

The Recipient shall submit a draft version of the document to the COR prior to the publication, presentation, or announcement. The COR shall review the draft version of the document and notify the Recipient of approval or recommended changes. The final version, along with a completed NETL Form 510.1-5, shall be submitted to the NETL AAD Document Control Coordinator.

The following information shall be provided for conference papers and proceedings, etc.

-- Name of conference
-- Location of conference (city, state, and country)
-- Date of conference (month/day/year)
-- Conference sponsor

A.16 JOURNAL ARTICLES, CONFERENCE PAPERS AND PROCEEDINGS GENERATED BY A UNIVERSITY FOR DOE REVIEW (SEPT 2000)

The Recipient shall submit to DOE for review and comment all documents generated by the Recipient, or any subcontractor, which communicate the results of scientific or technical work supported by DOE under this award, whether or not specifically identified in the award, prior to submission for publication, announcement, or presentation. Such documents include journal articles, conference papers and proceedings, etc. Each such document shall be accompanied by a properly completed NETL Form 510.1-5, "Request for Patent Clearance for Release of Contracted Research Documents."

The Recipient shall submit a draft version of the document to the COR prior to the publication, presentation, or announcement. The COR shall review the draft version of the document and notify the Recipient of recommended changes. The final version, along with a completed NETL Form 510.1-5, shall be submitted to the NETL AAD Document Control Coordinator.

The following information shall be provided for conference papers and proceedings, etc.

-- Name of conference
-- Location of conference (city, state, and country)
-- Date of conference (month/day/year)
-- Conference sponsor